REMARKS

Claims 15-18 have been amended. Claims 13-14 have been cancelled herein without prejudice. Claims 19-20 have been added.

Claims 13-18 have been rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. Claims 13-18 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art ("AAPA") (U.S. Patent Publication No. 2004/0119835) in view of Shibuya et al. ("Shibuya") (U.S. Patent No. 5,896,705). With respect to Applicant's claims, as amended, these rejections are respectfully traversed.

Applicant's claim 15 has been rewritten in independent form and amended to better define Applicant's invention. More particularly, amended claim 15 recites an image sensing apparatus comprising: an image sensing element that outputs a charge signal in accordance with a light amount of an object image formed on a light-receiving surface; a light-shielding unit that shields said image sensing element from incident light; a determination unit that determines a compensation amount for compensating a loss in exposure amount for said image sensing element caused by delay in closing of said light-shielding unit; a setting unit that sets an exposure period of said image sensing element; and a control unit that changes the set exposure period based on the compensation amount determined by said determination unit if the exposure period is longer than a predetermined period, and changes a gain to be applied to the charge signal based on the compensation amount determined by said determination unit if the exposure period is equal to or shorter than the predetermined period, wherein, if the set exposure period is longer than the predetermined period and if the compensation amount

determined by said determination unit is greater than a predetermined amount, said determination unit determines a second compensation amount for gain to be applied to the charge signal based on an excess of the compensation amount over the predetermined amount, and said control unit changes the exposure period based on the predetermined amount so as to compensate a part of the loss in exposure amount for said image sensing element and changes the gain based on the second compensation amount so as to compensate the rest of the loss in exposure amount for said image sensing element. Claims 16 and 17 have been rewritten in independent form and similarly amended (although claims 16 and 17 recite different features as further discussed below). Further, independent method claim 18 has been amended to correspond to claim 15. Still further, newly presented independent method claims 19 and 20 respectively correspond to claims 16 and 17. No new matter has been added. Such a construction is not taught or suggested by the cited art of record.

With regard to the rejection of claims 13-18 under 35 U.S.C. 112, first paragraph, the Examiner has asserted that Applicant's specification does not teach "a compensation amount for compensating a loss in exposure amount for said image sensing element caused by delay in closing of said light-shielding unit." (Office Action, page 3, lines 18-20). Claims 15-17 have been amended to recite "a determination unit" (rather than "a calculation unit") that "determines a compensation amount for compensating a loss in exposure amount for said image sensing element caused by delay in closing of said light-shielding unit." For the reasons discussed below, it is submitted that the application sufficiently describes the "determination unit" in such a way as to reasonably convey to one skilled in the art that the inventor, at the time the application was filed, had possession of the claimed invention.

In the application as originally filed, the determination unit is described as system control circuit 109 which "determines a compensation amount of the electronic shutter speed required for compensation" (page 22, lines 22-24) and "compensates light amount losses caused by mechanical shutter operation" (page 21, lines 11-13). Fig. 2 of the drawings as originally filed shows a flow chart that shows the exposure amount compensation process (page 22, lines 1-2), and it is submitted that the term "compensation" in the application, based on the discussion in the application, would be understood by one of ordinary skill in the art to indicate compensation of light amount losses caused by the mechanical shutter operation. As described, in step S303 in Fig. 2, "the system control circuit 109 determines the compensation amount [for compensating the light amount losses caused by mechanical shutter operation] of the electronic shutter speed" (page 23, lines 1-2). In addition, since the shutter speed has been determined prior to step S302 (otherwise, it is not possible to perform the determination in step S302), typically on the basis of the result of photometry (i.e., a conventional technique), it would be appreciated by those skilled in the art at the time of the invention that "electronic shutter compensation process" of step S303 is not an ordinary exposure correction to keep a correct exposure based on the result of photometry, but an exposure correction to keep a correct exposure by compensating light amount losses caused by mechanical shutter operation. Hence, the application sufficiently describes the "determination unit" in such a way as to reasonably convey to one skilled in the art that the inventor, at the time the application was filed, had possession of the claimed invention.

With respect to the rejection of the claims under 35 U.S.C. 103(a) in view of the combination of AAPA and Shibuya, the present invention, as recited in each of the independent

claims, includes features that are neither disclosed nor suggested in either of the cited references. The present invention, as recited in independent apparatus claims 15-17, is characterized by, in general, compensating the loss in exposure amount caused by delay in closing of the light-shielding unit by changing the set exposure period if the exposure period is longer than a predetermined period, and by changing a gain to be applied to the charge signal if the exposure period is equal to or shorter than the predetermined period. In addition, the present invention, as recited in independent claims 15 and 16, specifies the control when the loss in exposure amount caused by delay in closing of the light-shielding unit cannot be fully compensated by one of the exposure period control and gain control. In particular, claim 15 recites that when the loss cannot be completely compensated by controlling the exposure period, then the remaining loss is compensated by controlling the gain. Claim 16 recites that when the loss cannot be completely compensated by controlling the gain, then the remaining loss is compensated by controlling the exposure period. These features are neither disclosed nor suggested in the cited references.

In the Office Action, the Examiner indicated that "AAPA does not [teach] chang[ing] a gain to be applied to the charge signal based on the compensation amount calculated by said calculation unit if the exposure period is equal to or shorter than the predetermined period." (Office Action, page 5, lines 6-8). Instead, the Examiner has relied upon Shibuya for teaching various features recited in claim 15 (previously recited in cancelled claim 13), including, among other things, an exposure adjustment apparatus and calculating a second compensation amount for gain to be applied to the charge signal. But as illustrated below, Shibuya does not disclose these and other features of Applicant's claim 15.

Shibuya discloses to change an exposure time so that a signal level of video signal S12 approaches a reference value, and in a case where the exposure time has to be lengthened to above the longest exposure time stored in memory, the exposure time is set to the shortest exposure time, and a gain of amplifying means is increased by one step (column 7, lines 48-54 of Shibuya). However, this operation is not desired in the present invention and does not correspond to Applicant's recited features. According to the present invention, as recited in claim 15, if the exposure period is longer than a predetermined period, the loss is first compensated by changing the exposure period, and only when the loss cannot be fully compensated by changing the exposure period, then the gain is changed so as to compensate the remaining loss. The exposure period is not further changed at the time of changing the gain. Hence, Shibuya does not disclose these features of claim 15.

Similarly, Shibuya discloses to change the gain of the amplifying means so that the signal level of the video signal S12 approaches the reference value, and in a case where the gain of the amplifying means has to be increased to above the largest gain value stored in the memory, the gain is set to the smallest value, and the exposure time is increased by one step (column 8, lines 21-26 of Shibuya). However, this operation is not desired in the present invention. According to the present invention, as recited in claim 16, if the exposure period is equal to or shorter than the predetermined period, the loss is first compensated by changing the gain, and only when the loss cannot be fully compensated by changing the gain, then the exposure period is changed so as to compensate the remaining loss. The gain is not further changed at the time of changing the exposure period. Hence, Shibuya does not disclose this recited feature of claim 16.

As illustrated from the above discussion, Shibuya neither discloses nor suggests applicant's "control unit," which implements the above discussed features recited in independent claims 15 and 16. Moreover, AAPA also neither discloses nor suggests such features recited in claims 15 and 16.

As for independent claim 17, claim 17 specifies that, even when an image sensing mode for maintaining a set exposure period, if the set exposure period is longer than a predetermined period, then the exposure period is changed based on the compensation amount determined by the determination unit. As already illustrated, this feature is neither disclosed nor suggested in either Shibuya or AAPA.

Therefore, neither of the cited references discloses the above-described features of Applicant's independent apparatus claims 15, 16 and 17. Hence, Applicant's claims 15, 16 and 17, as well as Applicant's independent method claims 18, 19 and 20 since they correspond respectively to claims 15, 16 and 17, thus patentably distinguish over the combination of AAPA and Shibuya.

In view of the above, it is submitted that Applicant's claims, as amended and newly presented, patentably distinguish over the cited art of record. Accordingly, reconsideration and allowance of the application and claims is respectfully requested.

Dated: August 13, 2009

Respectfully submitted,

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